

are of smaller dimensions, one with a pair of small bellows, and the other with a syringe; but both of these, like the steel mill, require a person to work them constantly, and will probably be superseded by the simple construction first described.

An Account of an Invention for giving Light in explosive Mixtures of Fire-damp in Coal Mines, by consuming the Fire-damp. By Sir Humphry Davy, LL.D. F.R.S. V.P.R.I. Read January 11, 1816. [Phil. Trans. 1816, p. 23.]

This contrivance consists in covering the flame of any lamp or candle with a wire sieve, the apertures of which may be as large as $\frac{1}{8}$ th of an inch square.

When a cylinder of wire gauze, covered at top with the same gauze, is closely fitted to a lamp, and surrounds its flame so that there is no aperture but those of the gauze, if the little lantern so constructed be introduced into the most explosive mixtures of carburetted hydrogen and air, the cylinder becomes filled with a bright flame at its interior surface, which continues to burn as long as the mixture remains explosive.

When the carburetted hydrogen constitutes no more than $\frac{1}{12}$ th of the mixture, the flame of the wick continues to burn surrounded by the flame of the fire-damp; but when the proportion is as 1 to 7, the flame of the wick disappears.

When the apertures of the gauze are of the largest size, the flame is the most brilliant, and the wire of which it consists becomes ignited, but still without occasioning explosion of the mixture external to the lamp.

Similar experiments were also made with hydrogen (not carburetted), and with the same results. But in this case the gauze was of the finest kind, with 6400 apertures in the square inch; and since the thickness of the wire was $\frac{1}{32}$ th of an inch, the apertures themselves were about $\frac{1}{16}$ th of an inch square. With gauze of this construction a flame may be introduced even into a mixture of hydrogen and oxygen, and burn this mixture at the inner surface of the lantern, without communicating its flame to the mixture externally, even though the wires become intensely red hot.

After such trials of the security of this little apparatus, the author has no hesitation in recommending it for adoption by the collier, who will require for his security nothing more than a little wire cage to surround the flame of his lamp, and thus, at the cost of a few pence, will procure a light as long as there is a sufficient supply of fire-damp, without any further expense.